South African Medical Journal
Suid-Afrikaanse Tydskrif vir Geneeskunde
P.O. Box 643, Cape Town Posbus 643, Kaapstad

Cape Town, 26 March 1955 Vol. 29 No. 13 Kaapstad, 26 Maart 1955
Weekly 2s. 6d. Weekliks 2s. 6d.

EDITORIAL

RAUWOLFIA

This anti-hypertensive drug is being regarded as fulfilling a distinct need,[1] particularly in conjunction with the other hypotensives in current use. Rauwolfia is itself only moderately hypotensive but its mild, slowly progressive action is valuable and it produces few untoward effects. Used alone its sedative action is superior to that of the mild barbiturates for the reduction of blood pressure and for the relief of anxiety, irritability and compulsiveness. Even in large doses the drug does not lead to addiction or tolerance. It produces marked symptomatic improvement in most hypertensive patients and relief of headache, fatigue, palpitation and anxiety is brought about in almost every patient; the hypotensive action appears to be significant although slow and moderate in development.

In mild to moderate degrees of hypertension rauwolfia alkaloids would therefore appear to be of value and to produce results definitely superior to those obtained with ordinary sedatives. In more advanced cases, however, it should be supplemented with the more potent hypotensive agents such as hydrallazine, methonium compounds and veratrum preparations. Without rauwolfia this group of drugs may be difficult to use with safety. The concurrent use of rauwolfia permits their use in smaller dosage, and rauwolfia may also be given to maintain a normal (or almost normal) blood pressure once this has been achieved by combinations of the drugs. In this role as an adjuvant it may be that its action is not only additive but also synergistic. Furthermore, the benefits of combined therapy go beyond this, for rauwolfia counteracts certain of the undesirable effects of the more potent drugs. Thus it considerably lessens the nausea and vomiting that sometimes follow the use of veratrum preparations; it reduces the constipating action of methonium compounds; it counteracts the tachycardia and palpitations produced by hydrallazine. These benefits are attributed not so much to a tranquillizing effect of the drug through an action on the cortex but to its action in the midbrain, where it is supposed to have certain adrenergic blocking effects. This may account

VAN DIE REDAKSIE

RAUWOLFIA

Die mening word gehuldig dat hierdie antidrukverhogingsmiddel in 'n definitiewe behoefte voorsien,[1] veral as dit saam met ander gewone antidrukverhogingsmiddels gebruik word. Rauwolfia self is nie 'n sterk antidrukverhogingsmiddel nie maar die matige werking, wat geleidelik toeneem, is waardevol en teenspoedige gevolge is min. As dit op sigself gebruik word om bloeddruk te verlaag, en om angs, prikkelbaarheid en dwang-impulse te verlig, het dit 'n meer kalmerende uitwerking as die ligte barbiturate. Selfs in groot dosisse lei dit nie tot verslawing of vatbaarheid nie. In die meeste gevalle van drukverhoging verbeter die simptome merkbaar en in feitlik elke geval verlig dit hoofpyn, afmatting, hartkloppings en angs; alhoewel dit stadig en matig ontwikkel, blyk die drukverlagingswerking betekenisvol.

Dit kom dus voor dat rauwolfia-alkaloïdes van waarde is met die behandeling van drukverhoging in 'n ligte of matige graad en dat dit resultate lewer wat bepaald beter is as dié van gewone kalmeermiddels. Vir ernstiger gevalle moet dit egter deur sterker drukverlagingsmiddels soos hydrallazine, methonium-verbindings en veratrum-preparate aangevul word. Sonder rauwolfia mag dit moeilik gaan om met veiligheid hierdie middels te gee. Die gelyktydige toediening van rauwolfia maak dit moontlik om kleiner dosisse van dié middels te gebruik. Rauwolfia kan ook gegee word om normale (of amper normale) bloeddruk te handhaaf sodra dit deur kombinasies van hierdie middels verkry is. In hierdie rol as hulpgeneesmiddel bestaan die moontlikheid dat dit nie net alleen additief is nie maar dat dit ook sinergisties is. Die voordele van gekombineerde terapie strek selfs verder as dit, daar rauwolfia sekere ongewenste nagevolge van die sterker middels teenwerk. Dus verminder dit tot 'n groot mate die mislikheid en vomering wat somtyds op die toediening van veratrum-preparate volg; dit verminder die hartlywigheid wat na die toediening van methonium-verbindings volg; dit werk die hartversnelling en hartkloppings teen wat deur hydrallazine veroorsaak word. Hierdie voordele word nie so seer aan die kalmering toegeskryf nie wat volg op die werking van die middel op die skors as aan die uitwerking op die middelbrein waar dit veronderstel is om sekere bynieragtige versperringswerk te verrig. Dit mag sulke gevolge verklaar soos neusverstopping en miose en ptose wat veral by diere voorkom, die stadige hartslag en die

for such effects of the drug as the nasal stuffiness and the miosis and ptosis that occur especially in animals, the bradycardia, and the increased motility of the bowel; there may be other explanations for certain other effects. The drug sometimes causes nightmares and anxiety when given in big doses. In men a decrease in libido, but not impotence, can be produced; this effect does not occur in women.

Finnerty [2] agrees with Wilkins [3] that a real symptomatic improvement is produced by rauwolfia. He found no appreciable benefit from its use in congestive heart failure and also that when hypertensive vascular disease was treated by rauwolfia alone the status of the hypertensive vascular disease was not appreciably changed. When a combination with the other antihypertensive drugs was used the progress of the vascular disease appeared to be slowed and even regression of organic changes might take place.

During rauwolfia therapy the patient tends to gain weight from an increase in appetite or lessened 'nervous' activity, and this may present a problem, especially in obese patients.

Rauwolfia is not a drug that acts suddenly or powerfully. It has a gradual mild hypotensive action, which results perhaps from its tranquillizing effect. The action takes about 3-6 days to appear, 3-6 weeks to reach a maximum, and 3-6 weeks to disappear. Only after weeks of continuous administration, therefore, can the effectiveness of the drug be judged.

Rauwolfia serpentina is a handsome bush with shiny green leaves and pink flowers. It has long tapering snake-like roots, which are the main source of the drug. A yellow powder prepared from the root has long been used in India for various purposes; physicians in India observed the hypotensive action of the drug, which in that country was mainly used in cases of mental disturbance. Extracts of the plant and purified active alkaloids have been prepared. The action of all these preparations is clinically very similar provided equivalent doses are used (100 mg. of the root, or 2 mg. of the alseroxylon fraction, or 0·1 mg. of reserpine).[3] The drug may be given orally in these doses 1-4 times a day; or it may be given at bedtime, or in the morning, according as the sedative effect is required in relation to daytime activity or to disturbed sleep. Different schedules may be tried, but it should be borne in mind that continuation of large doses may produce overdosage effects; it takes some time for either the beneficial action or cumulative effects to appear.

1. Editorial (1954): S. Afr. Med. J., **28**, 511.
2. Finnerty, F. A. (1954): Amer. J. Med., **17**, 629.
3. Wilkins, R. W. (1954): *Ibid.*, **17**, 703.

verhoogde beweeglikheid van die ingewande; daar mag ander verklarings vir sekere ander gevolge wees. As die middel in groot dosisse gegee word veroorsaak dit somtyds nagmerries en angs. In mans kan dit die libido maar nie die onvermoë verminder nie; hierdie reaksie kom nie by vrouens voor nie.

Finnerty [2] stem met Wilkins [3] saam dat rauwolfia werklik 'n simptomatiese verbetering teweegbring. Hy het gevind dat met die gebruik van hierdie middel daar geen aanmerklike verbetering in kongestiewe hartverlamming bespeur word nie. Hy het ook gevind dat as rauwolfia alleen gebruik word vir die behandeling van vaskulêre siekte wat op drukverhoging volg, dié siektetoestand nie aanmerklik verander nie maar as dit saam met ander antidrukverhogingsmiddels gebruik word dit oënskynlik die ontwikkeling van die vaskulêre siekte vertraag en dat dit selfs teruggang van organiese veranderings mag bewerkstellig.

Met rauwolfia-terapie is die pasiënt geneig om gewig op te tel. Dit kan die gevolg wees van verbeterde eetlus of van verminderde 'senuwee'-aktiwiteit en kan veral in die geval van vetsugtige pasiënte 'n probleem skep.

Dit ageer nie skielik of sterk nie en verlaag die druk geleidelik en gematig, moontlik as gevolg van die kalmerende uitwerking. Dit neem omtrent 3-6 dae voordat resultate verkry word. 3-6 weke om 'n hoogtepunt te bereik en 3-6 weke om te verdwyn. Derhalwe kan die doeltreffendheid van die middel slegs na weke van onafgebroke toediening beoordeel word.

Rauwolfia serpentina is 'n mooi struik met blink groen blare en ligroos blomme. Die wortels, wat die vernaamste bron van die middel is, is lank, spits en slangagtig. In Indië word 'n geel poeier, wat van die wortel berei word, vir jare al vir verskeie doeleindes gebruik; geneeshere in Indië het die drukverlagingswerking van die middel ontdek en dit hoofsaaklik in gevalle van geestessteurings gebruik. Aftreksels van die plant en gesuiwerde aktiewe alkaloïede is al berei. Klinies is die werking van al hierdie preparate baie eenders mits dat ekwivalente dosisse gebruik word (100 mg. van die wortel of 2 mg. van die alseroxylon-fraksie of 0·1 mg. van reserpine).[3] Sulke dosisse kan 1-4 keer daagliks per mond gegee word; of dit kan met slaaptyd of soggens toegedien word al na gelang die kalmerende uitwerking in verband met die dag se aktiwiteit of die nag se slapeloosheid gebring moet word. Verskillende tydtafels kan op proef gestel word maar dit moet altyd in gedagte gehou word dat om met groot dosisse aan te hou, dit die gevolge van te groot dosisse mag uitlok; dit neem 'n hele rukkie voordat die voordele of die kumulatiewe werking openbaar word.

1. Van die Redaksie (1954): S. Afr. T. vir Geneesk., **28**, 511.
2. Finnerty, F. A. (1954): Amer. J. Med., **17**, 629.
3. Wilkins, R. W. (1954) *Ibid.*, **17**, 703.

ULTRASONICS

English-speaking workers on both sides of the Atlantic are very critical of new physical methods of treatment, and any advance in these methods makes heavy weather in the conservative and critical climate of Britain and the United States. The newest form of treatment in this field is ultrasonics, a name given to mechanical (in contradistinction to electromagnetic) energy waves that travel at a rate faster than 20 kilocycles per second (the

frequencies used in medicine are much higher than this, in the vicinity of 800-1,000 kilocycles per second).

The ultrasonic beam is a device for projecting heat into the tissues. 'Ultrasonics are a useful alternative method of thermotherapy which gives results comparable to those of short-wave diathermy',[1] although for various reasons it is unlikely that ultrasonics will ever replace it. Among other reasons, the apparatus is expensive, the technique difficult, and the published results of its therapeutic efficacy in most conditions not significantly superior to those obtained with other methods. However, the energy waves in the ultrasonic beam, which are dissipated in the tissues as heat, are selective in that most energy is released at the tissue inter-faces, e.g. between muscle and sheath, tendon and areolar tissue. Moreover, their mechanical effects cause increased tissue permeability and hasten the rate of ion exchange over the cell membranes. This specialized action of ultrasonics makes it the treatment of choice (1) in cases where scarring due to fibrous-tissue formation is the main factor, e.g. adherent scars following plastic operations, healed skin ulcers and even cases of Dupuytren's contracture; (2) where there is exudation of blood and haematoma formation, as in sports-field injuries; and (3) in the treatment of bursitis and tendinitis—conditions which respond more rapidly to treatment by the methods of physical medicine than any other.

There has been a tendency to lay stress on the potential dangers of ultrasonic treatment, though most of its protagonists tend to dismiss them as unimportant. Properly carried out, with a good layer of liquid paraffin between the head of the beam and the affected part (excluding air, which is an absolute barrier to the waves) and applied to 'non-dangerous' parts of the body, there is very little real danger apart from overheating of the tissues, which manifests itself as a dull ache or an actual pain. It is obvious that the inexperienced practitioner applying ultrasonic treatment should adopt a conservative approach until he has acquired enough experience to enable him with confidence to select his cases and control the application. Most workers on the subject have made this point. In a recent number of the *Practitioner*[1] articles on the subject are to be found and at page 300 of this issue we publish an article in which Dr. R. Robins-Browne relates his experience of the use of this latest addition to the armamentarium of the physical medicine specialist.

1. The Practitioner (1955): **174**, 216

THE BASIC APPROACH TO THE PROBLEM OF THE RECOGNITION OF HUMAN MALNUTRITION

SOME PERSONAL VIEWPOINTS

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The need for more accurate information concerning the criteria of human malnutrition, and a satisfactory basic approach to the problem of its recognition, is still growing in importance in the nutritional field. In South Africa improved housing and nutrition for certain population groups are much under discussion these days, necessitating more efficient nutrition surveys in both urban and rural areas—surveys which will necessarily have to include socio-economic and other dietary investigations as well as clinical, somatometric and laboratory methods.

Lack of information concerning practical methods for recognizing and measuring the extent of human malnutrition, particularly in growing children, is still holding back much important work in this country. The importance of this gap in our knowledge is evident not only from the literature, but also from the fact that the Joint FAO/WHO Expert Committee on Nutrition at its recent sessions in Rome and at Fajara (Gambia) devoted a great deal of its time to the discussion of these questions; the opinion of the Committee was that there was urgent need for an international document which would indicate the kinds of surveys that might most usefully be undertaken to assess nutritional status; and that it was desirable for WHO and FAO to provide (as far as possible) advice, leadership and aid in the solution of these problems. Such surveys could serve either as a basis for programmes to improve nutrition, or for purposes of basic research into the criteria of good nutrition and general well-being, which might lead to a useful re-evaluation of the more doubtful criteria now employed—often only too dogmatically.

These issues should, for the time being at least, be subject to constant review in accordance with advances in our knowledge and thinking on this whole matter. To attain this end, concise critical reviews of current opinion concerning the more important claims in this field and the extent of their usefulness or reliability in nutrition survey work, should be welcomed, and this paper is a small effort in this direction.

It is when trying to raise standards of living and levels of nutrition (two very basic objectives) that one realizes the complexity of the problem of nutrition; there is no one single approach for its solution. Correct appraisal, however, of the rise or fall in 'standards' or 'levels' calls for reliable measurement or 'yardsticks'; and if with these we are to measure or even appreciate

deviations from the normal, we have to know what constitutes normality.

BASIC APPROACH TO THE PROBLEM OF NUTRITIONAL ASSESSMENT

The new emphasis in the approach to the problem of nutritional assessment seems therefore to be on Normal Nutrition Values.

Too often the procedure in any large-scale nutritional assessment experiment on, let us say, the school-going population of a country is still essentially as follows: Itinerant school medical officers, assisted by school nurses and lay workers, would proceed to examine, weigh and measure school-children after having agreed more or less on the standards to be adopted. After examination, the children are classified on the lines of the Dunfermline scale (see p. 294). It is obvious that such classifications cannot be regarded as reliable, because of lack of proper knowledge and definition of the elusive concept of normality.

On the other hand, programmes for correction of malnutrition should not be allowed to stand over indefinitely merely because of lack of further scientific data to diagnose the situation in full. Every possible effort should be made to get at least an idea of the approximate extent of under-nutrition by application of useful current methods. Then with the so-called Normal subjects as experimental material (and these have first to be found) one could get down to other practical issues, such as testing out the reliability of doubtful current methods, as well as new ones.

Further usefulness of nutrition surveys lies in the fact that they enable us to establish normal nutrition values for certain age-groups, socio-economic segments, etc., of a population or population-group—even if only roughly, since the extent of possible adjustment to a wide range of dietary intake with no recognizable ill-effects, still remains an important consideration. Structural changes will set in only when deficiency is already fairly well advanced (often even to an irreversible degree) which makes early detection of slight deviations from the normal important, and this cannot be solved by a clinical examination only.

An inevitable basic need, therefore, is the establishment, in the first instance, of normal nutrition values for the particular country, region or population-group under examination. Time thus spent initially is time invested at great interest and results of this kind constitute a valuable contribution to the knowledge of the subject, not only from the national but even from the international point of view.

McCarrison in 1937 defined Nutrition as 'the sum of the acts or processes by which the structure and functions of organs and parts of the body are established and maintained. It is, in short, that function of the body by which health is maintained'.

It is generally agreed that the main factors underlying malnutrition include *disease* (both congenital and acquired), *parasitic infestation* (e.g. helminthic, malaria, schistosomiasis), and *endocrine disorder* or imbalance (e.g. Frölich's syndrome), while minor factors such as defective hygiene, overcrowding, insufficient sleep and emotional or psychological maladjustment can all play some role in the production of malnutrition.

On the other hand, it is clear that *nutrition cannot be satisfactory unless the diet is satisfactory.*

So, before considering malnutrition, we should have some idea of what constitutes normal nutrition, particularly as we are apparently dealing with 2 standards—normal and optimum. The term 'normal nutrition', as ordinarily used, indicates something which is satisfactory but not optimal, and the fact that the first 2 groups in the Dunfermline scale are labelled 'excellent' and 'normal' already shows that 'normal' is not the same as 'optimal'.

To the nutritionist the most important aspect of the nutrition problem is the definition of satisfactory and optimum diets. We have already defined an optimum diet as a diet additions to which will not cause any improvement in the individual's physical development, functional efficiency, or resistance to disease or strain. Without an optimum diet no individual can enjoy optimum nutrition; on the other hand, several factors referred to above can prevent normal nutrition or normal health from being achieved, even on an optimum diet. The unfortunate fact is that some of these elements are still only partially under human control, with a consequence that, although as nutritionists we should be 'aiming at the stars to shoot the tree-tops' we should also be realistic enough not to delay remedial advice and action because of lack of definition of so-called optimal nutrition standards. Let us meantime, therefore, rather get more clarity on so-called satisfactory or normal ranges in nutrition.

Optimum nutrition can perhaps best be defined as a state of nutriture in which there is no further room for improvement in the individual's physical development, functional efficiency and resistance to disease or strain, while downward departures from this optimum (if not the result of defective diet or disease) may be due to any one of the other factors cited above as possibly influencing nutrition.

On the other hand, to distinguish between optimum nutrition and optimum health, this definition is perhaps somewhat unsatisfactory since it excludes the effects of 'conditioned' deficiency-states in which, for example, gastro-intestinal or endocrine disorder may 'condition' a deficiency-state even when an optimum diet is not only available but perhaps actually being consumed.

As yet, therefore, no clear distinction can be drawn between optimum nutrition and optimum health and the literature is still vague on this point. There is probably no such thing as a normal diet, and normal nutrition as opposed to optimum nutrition can probably be achieved on what is usually referred to as a satisfactory diet, which can be defined as a diet which is adequate enough to prevent any deterioration in health and efficiency under the normal conditions or demands of life, and carries with it some margin to make it adequate for at least some of the abnormal calls which the individual is likely to meet, such as infectious illness, violent exercise, undue exposure to cold or heat, and so forth.

Having now attempted to get a better concept of normal, satisfactory and optimum standards in relation to nutrition and diet, the problem of malnutrition and

its assessment can perhaps be approached more satisfactorily.

THE PROBLEM OF MALNUTRITION AND ITS ASSESSMENT

While the nutritionist recognizes the numerous factors which enter into the production of malnutrition, his argument consistently is that the dietary factor is the one which can, if only to some extent, be controlled. His problem, therefore, is to know how the role of a defective diet in the production of an observed state of malnutrition can be reliably assessed and distinguished from all possible contributory factors. How could it, for instance, through examination of a group of school children, be determined what percentage of them are not receiving an adequate diet and in which components it is inadequate? *What* physical deviations from normal (as a result, not of the presence of disease, but solely of lack of a proper dietary intake or enough food) are to be looked for or measured in these children, and *how* or by what methods?

Roughly speaking there are 3 degrees of severity in which malnutrition may manifest itself, the worst of course being starvation, which usually is essentially the result of deficiency of total calories in the diet, and where the individual is obviously thin, underweight and of inferior stamina.

In the intermediate degree the individual, while not necessarily thin, may on close examination show certain definite symptoms of vitamin or mineral deficiency, often first detectable in the skin and mucous membranes. Contrary to starvation, this type of malnutrition is more often than not caused by general lack of 'protective' foods in the diet and—what is more important—can often occur even on a 'normal' total calorie intake.

In the mildest degree of malnutrition, often referred to as sub- or under-nutrition, the stigmata of vitamin or mineral deficiency may be absent and the deficiency may be only recognizable by means of rather elaborate biochemical or physiological tests; height and weight may even be on the average. The essential criterion of this stage of sub-nutrition is that, generally, the physical and mental efficiency, stamina, and resistance to disease, can be improved on a more 'protective' diet. Hence the intrinsic value of food-supplementation experiments, particularly in rapidly-growing children.

It is perhaps not always fully appreciated how much laboratory and clinical research are applicable to early life, the formative years of childhood, puberty, and adolescence, when growth is occurring and when the baleful effects of under- or malnutrition are probably of greater concern than afterwards, however significant this latter period may also be.

Because of this we shall, purely by way of illustration, assume throughout the rest of this discussion that we have decided to undertake a good nutrition survey on (say) a representative sample of children drawn from the school-going population of (say) an industrial city.

THE VALUE OF CLINICAL APPRAISAL

The general consensus of opinion today is that there is obvious need for a more comprehensive basic approach to the problem of the recognition of human malnutrition than mere clinical assessment. But, however adverse (if not perverse) the manifestations of nutrition deficiency may be, there nevertheless are certain unmistakable signs and symptoms induced chiefly through undernutrition which an experienced clinician can usually recognize even though, by itself, clinical appraisal—note, not only clinical examination—is usually nonspecific. Moreover, the clinical examination is an extremely important facet of nutritional assessment—not so much because the clinician can expertly distinguish between malnourished and normal subjects as because the 'conditional' factor already referred to can largely be eliminated only with his help.

In other words, the clinician's primary role in any nutrition-survey team is to screen off all the diseased subjects, leaving it then to the other members of the team to distinguish between Malnourished and Normal subjects by means of further tests. Not that he could not also assist with the latter; but elimination, right at the beginning, of any possible evidence of present active disease is held to be the soundest basic approach to the whole problem with which this paper deals. He is, in the first instance, therefore, the pathologist and only in the second instance the nutritionist.

After correct sampling the clinician will, before anything else, search for evidence of congenital or hereditary derangement, acquired disease or endocrine disorder, the subjects of these being classified as 'diseased' and rejected, while the other members of the team may then proceed to classify the remainder into 'Normal' and 'Malnourished'. Even if the main function of the clinician ends here, it nevertheless has been a very important one.

Clinicians, furthermore, hold that besides detecting other pathological conditions it should be possible in a clinical examination also to detect the stigmata of at least some recognized deficiency disorders, e.g. the epiphyseal enlargement of rickets, keratomalacia of vitamin-A deficiency, and so forth. Some of these stigmata are today established beyond question and a child showing any one of them would certainly be placed by the clinician in group 4 of the Dunfermline scale ('general condition poor and requiring treatment'). Also other stigmata such as departures from normality in the skin and mucous membranes, known to clear up on a good all-round diet, may be recognizable even when the responsible factor cannot be identified by the clinician. In certain conditions, of course, such as advanced scurvy, rickets, and pellagra, symptoms may show up even to the extent of 'smiting' him.

But, however undefinable symptoms may be, such as abnormal manifestations of the facial skin and buccal mucosa, commonly associated with deficiency of riboflavin, nicotinic acid or other components of the vitamin-B complex, the fact remains that the finding of any of these stigmata would lead a competent examiner to place the child in group 4 of the Dunfermline scale, for although he may have the gravest suspicion of defective diet, the deficiency state as witnessed by him may be a manifestation of a 'conditioning' gastro-intestinal or other disorder even in the presence of a satisfactory

diet. So again, the clinical slant on nutritional phenomena of this kind, seems indispensable.

For this reason it is always better to conduct nutrition surveys of a more elaborate kind in hospital vicinities so that full use can be made of the resources of hospital diagnostic departments. Particularly when it comes to the establishment of normal nutrition values, it is always an advantage to have hospital facilities available in view of the great importance of the elimination of disease as a 'conditioning' factor in malnutrition.

It is also not always appreciated that successful clinical identification of the so-called 'conditioning' factors is as indispensable a part of our armamentarium as the need for more satisfactory somatometric and dietary-survey methods since, while there is the greatest need today for more accurate knowledge concerning normal human requirements, this gap in our knowledge can really only successfully be bridged through further careful research, not so much on diseased or malnourished as on *normal* human beings.

Unfortunately, nutritional assessment today is still too often carried out along Dunfermline lines only as a sort of haphazard 'trouble shooting' survey of health and nutrition, often based only on available statistics not specially collected for nutrition-survey purposes and then correlated with the vital statistics of the country. This can give rise to very erroneous conceptions concerning the real incidence of malnutrition in a community or country.

In nutritional assessment on the lines of the Dunfermline scale, school medical officers would, for instance, examine, weigh and measure (say) batches of school children after having met to concur on the standards which are to be adopted. After examination each subject is put into one of the four convential groups of the Dunfermline scale as follows:

General Condition	*Assessment*
1. Excellent	Normal (nutrition satisfactory)
2. Good	
3. Slightly sub-normal and requiring supervision	Considered as Malnourished
4. Poor and requiring treatment	

Two questions immediately arise here: (1) In relation to the reliance which can be placed on figures of this kind, since different examiners have different standards of Normality in classifying children according to the Dunfermline scale, although probably all examiners would be agreed on the recognition of the two extreme groups—1 and 4. (2) Experience shows that there is difference of opinion as to where the borderline between groups 2 and 3 really lies, apart also from the subtle difference between clinical appraisal and clinical examination:

The clinical *examination*, one feels, should aim at provisional elimination or rejection of all obviously diseased subjects through careful search in the first place for marked evidence of congenital abnormalities, acquired disease or endocrine disorder; and, furthermore, through search for stigmata of recognized deficiency-disorders, or any other stigmata which will be regarded by an experienced clinician as probably indicative of minor ill-health of some sort.

Clinical *appraisal*, carefully applied, can often help to establish the existence of what was referred to earlier in this paper as the second or intermediate degree of malnutrition. It is, however, generally admitted today that it is unreliable in detecting the third or mildest degree of malnutrition or, in terms of the Dunfermline scale, it is unreliable in differentiating between the second and third groups, i.e. individuals, respectively labelled as 'general condition good' and 'general condition requiring supervision'.

To conclude, the clinician cannot be left out of the picture, but *the clinical examination should, in the first instance, not be employed as a means of selecting malnourished subjects but of excluding present active disease or pathology* as a possible 'conditioning' factor for improper absorption or utilization of food in the body, irrespective of the actual dietary intake or availability of enough good food. To omit the clinical examination or health survey aspect of any important nutrition investigation is unwise, for the potential influence of disease in hampering proper nutrition is too important to be overlooked. This includes all conditions which interfere with digestion, absorption or utilization of nutrients, even those that increase their requirement, destruction or excretion—the so-called 'genetotrophic' factors. The interpretation of the results of a general clinical examination will, therefore, always be tentative until all the other available data are also known.

With this material we may then proceed 'to separate the goats from the sheep' and, very important, to test out the reliability or otherwise of the methods in use, as well as new ones. It is here that our greatest basic contribution to the knowledge of the subject will probably be made.

SOMATOMETRIC INDICES

Briefly, somatometric methods include body measurement from which, by the application of mathematical formulae or indices, figures are derived which are supposed to give information on the state of nutrition. Let us, however, state very categorically here that, of the numerous physical indices of nutrition so far proposed, no agreement has yet been reached as to which index is the best. It should, nevertheless, be our aim to make our methods as thorough and far-reaching as possible in the present state of knowledge. As in the case of clinical assessment, somatometric or anthropometric indices probably also play some useful part in their own particular way.

The most important reason for the use of somatometric indices in the judgment of the nutritional status of individuals must probably be looked for in the original work of Franzen * who, by using statistical methods, tried to discover on which items a group of medical men—consciously or subconsciously—based their clinical assessment findings when working with large groups. He concluded that in actual practice, when asked to select malnourished children, the points uppermost in their minds were: (*a*) musculature (the amount and

* Franzen, R. (1929): *Physical Measures of Growth and Nutrition.* New York: Amer. Child Health Assoc.

quality of muscle), (*b*) adipose tissue (the amount and quality particularly of the subcutaneous tissue,) and (*c*) skeletal dimensions, or maturation.

In judging the amount and quality of soft tissue, i.e. both muscle and subcutaneous tissue, the physicians emphasized the fact that at the back of their minds they were continually relating the amount and quality of soft tissue to the skeletal size or peculiarities.

Franzen then measured the weight, skeletal, muscular and fat dimensions of many thousands of children and correlated his measurements with medical judgment based more or less on Dunfermline lines. In this way various methods employing numbers of body measurements were evolved to assist in forming an adequate picture of soft tissue in relation to skeletal build. The usefulness of many of these physical indices of nutrition may, or may not, in time fully justify their employment. As matters stand today, however, one feels that the most honest reply to give on this point is as follows:

Although malnutrition may adversely affect the growth and maturation of bone and the growth of tissue mass, the indices constructed from these measurements are greatly influenced also by inherited growth patterns, presumably acting through the endocrine glands. The endocrine and other organs participating in osteogenesis certainly are very largely responsible for the shifting of calcium from the tissues into the bones and *vice versa*. Calcium and phosphorus, although essential for bone growth, also influence cell metabolism in general and, furthermore, there is a strong general impression today that any attempt to explain bone or skeletal derangements as due chiefly to malnutrition is something which is being strongly contradicted by observers in the laboratory and in the clinic.

It is possible that other indices may still be involved which will detect differences between groups of malnourished and normal children and it is not the intention here to discourage the use of somatometric methods. So far, however, none of these indices can be relied upon to classify (say) a child as malnourished or normal. Stature (as a result of skeletal development) can probably be as strongly influenced by endocrine and racial trends as by dietary habits. At the utmost these indices might be employed as rough 'screens' to eliminate from a population-group individuals who are mensurationally below normal. The exclusive use of somatometric indices, of whatever kind and however successfully carried out, must still be looked upon as inadequate, and they cannot be used to supplant, but only to supplement, clinical and laboratory methods. Actually, there is a personal standard for each individual and these indices are probably also under the control of factors other than just nutrition.

On the other hand, it is true that in the majority of children the effects of nutrition over a period of time do become depicted in their physical development, and that the periodical recording of these changes may be useful; particularly when by a simple objective method, such as for instance the 'Wetzel grid' or the 'Red graph method', bi-annual observations show how satisfactory progress has been in the past and give strong indications also of the progress which may be expected in the near or distant future.

There are strong reasons for believing that healthy developmental progress of each individual child continues in an established channel as though this were a preferred path, deviation from which may culminate in a pathological state.

It has not been possible to find in the literature any valid reason for a change of opinion on the present commonly-accepted view that physical fitness—however vague the term—is probably as closely related to *function* as to *structure*, if not more so, and is not easily to be expressed in numerical form.

LABORATORY METHODS

From the foregoing it is evident that, although there may be certain recognized clinical stigmata and measurements which will detect malnutrition (particularly if present in rather gross form), a number of them are still unreliable for the detection of minor degrees of malnutrition and they often fail to distinguish between the effects of disease and of dietary deficiency.

A further line of investigation in any worth-while survey, therefore, seems to be the analysis of the diet into deficiency (in quantitative terms) of precise dietary essentials. Biochemical tests represent the only satisfactory way in which the role of dietary deficiency can be separated from that of other factors in the production of malnutrition; they give a promise at least of quantitative knowledge about vitamin and mineral metabolism in the body, but before they can be usefully applied a level of adequate dietary intake has to be decided on, requiring methods other than mere biochemical ones.

As already stated, an adequate level must obviously be one which allows at least some margin for unusual calls upon essential nutrients as, for instance, in fever and violent exercise. But how much margin? Voigt, in the last century, fell into the error of assuming that because an average German workman consumed 118 g. of protein daily, this constituted an adequate level, while subsequent research has shown that this is really a luxus consumption level. Very often students of nutrition are in danger of falling into the same error by assuming that because doctors, students and laboratory workers in hospitals and research institutes normally consume a satisfactory diet, or fairly so, their particular plasma ascorbic-acid levels (merely to take an example) should be looked upon as desirable, while this actually may represent a luxus consumption level. No matter how desirable these levels may be, we are not justified in saying that health necessarily suffers if they are not attained.

Many tests suffer from the same difficulty as the method of clinical assessment according to the Dunfermline scale, in so far that there is as yet no final acceptable definition of the lower level of normality or of the borderline between normality and sub-normality. And this difficulty still applies to some biochemical tests recommended as useful in nutrition survey work. The only real way in which the majority of these questions can be finally solved, will probably be by the elaborate process of demonstrating that physical development,

functional efficiency and resistance to disease and strain in a group of individuals are not increased by further additions to an experimental diet over reasonably long periods while the individuals are exposed to all the stress of ordinary life. The inherent difficulties involved in the execution of an ideal experiment of this nature are, however, obvious, but until some such data are available some of the remedies for malnutrition must remain tentative from the strictly scientific angle. In this respect the work of Ancel Keys in Minnesota deserves special mention here. Since 1945 he has been working along these lines and his useful contribution towards closing part of this lamentable gap in our knowledge of the subject has been greatly appreciated.

Laboratory studies, in the first instance, usually include at least examination of the blood, urine and stools (particularly in tropical regions). The blood undoubtedly is a sensitive body tissue, detailed examination of which may often prove informative. One need only refer to the possible value of haemoglobin determinations, examination of smears for malarial parasites, chemical determination of plasma ascorbic acid, blood protein, calcium, phosphorus and phosphatase levels, liver function tests, etc.

In the absence of infection or other disease and of intestinal parasites and malaria, the finding of anaemia might be regarded as indicative of malnutrition. An exception to this would be the nutritional anaemia of infants, which usually develops when mixed feeding is introduced late. The important point, however, is that anaemia is uncommon in adolescents and in them, if the possibility of blood loss due to internal parasites were a remote one, low figures might be indicative of dietary deficiency; but again the finding would require careful interpretation against a geographical, climatic and socio-economic background.

Moreover, our knowledge concerning the exact lower levels of normal haemoglobins is still imperfect; work so far has shown so much overlap between the bloods of Normal and Malnourished individuals that really only the very low levels of haemoglobin could possibly be accepted as undoubted evidence of malnutrition. Even then mere haemoglobin determinations will not give us the full story, the only real key to iron therapy or deficiency being determination also of the mean corpuscular haemoglobin concentration (M.C.H.C.).

There is also the very common procedure of routine determinations of calcium, phosphorus and phosphatase for correlation with figures for these substances as found in qualitative analysis of the diet and urine. Great differences may, however, exist between the ability of any two persons to absorb and use calcium properly on high intakes of phytic and oxalic acids, proteins or fat. Again, while calcium and phosphorus are undoubtedly important in bone metabolism, they also greatly influence general cell metabolism and attempts to explain deficiency in bone growth primarily on the basis of derangements in mineral metabolism are no longer sufficient, and are being contradicted by the correlation of observations in the laboratory and in the clinic. It is becoming more and more obvious that the entire metabolic picture is necessary for interpreting the manner in which the body will deal with its calcium, phosphorus and vitamin D.

In this respect much current thought is also being given to the so-called 'genetotrophic' disease factors which occur when a diet fails to provide sufficient supply of one or more nutrients that are required in increased amounts because of the characteristic genetic pattern of the individual concerned. It is generally accepted today that some individuals are born with an impaired ability to utilize certain nutrients which, when ingested in so-called normal amounts, may prove insufficient for proper nutrition. It is also becoming increasingly apparent that, even some time after dietary deficiencies have been ameliorated, certain residual effects in the organism may continue to play a part that is not understood; and the effects of transient nutrition deficiencies on the subsequent absorption, utilization and metabolism of nutrients is another field where further research is definitely indicated today.

DIETARY STUDIES

This is a *sine qua non* on the simple basis that (as already stated) there can be no normal or proper nutrition unless the diet is satisfactory. Dietary-study methods are, however, beset with great difficulties, particularly when it comes to the interpretation of data. In this respect, one can hardly do better than quote from the article of Hunscher and Macy in the *Journal of the American Dietetic Association* of July 1951, on the use and abuse of dietary study methods:

> 'Planning intakes of any population group is complex and involves knowledge of many important factors in addition to the mere chemical composition of foods. Many of the limitations imposed upon dietary studies by these factors have been determined. For an individual group to undertake additional investigations of the diets of populations without familiarizing themselves with the background knowledge which we now possess will result in needless waste of effort and funds and will continue to introduce erroneous conclusions into the literature of nutrition .... whether the line of duty is one of keeping a running inventory of nutrients provided in a school lunch room, or evaluating dietary intake for purposes of therapy, or distributing a new food product, or of research, there are numerous potentially hazardous pitfalls .... (and) there is a need to keep abreast of the fast moving outflow of scientific literature pertaining to the composition of foods, the factors affecting nutritive quality and utilization, and ways and means of best collecting and sampling diets for estimation or analysis; they will be alert to the advantages and limitations of the different types of interpretation of the data collected and will draw only warranted conclusions.'

NUTRITIONAL ASSESSMENT AND GOVERNMENT NUTRITION PROGRAMMES

We ought, therefore, in a way to be 'burning the candle at both ends' all the time, viz. by assessing the real situation while at the same time sponsoring remedial programmes, since no programme for correction of undernutrition or malnutrition should necessarily have to wait on further or full scientific data.

An insistent demand from an informed profession for improved dietary standards would slowly strengthen the demand for government action; and while it is perhaps not the main responsibility of Nutrition or Health Departments to decide upon the best economic measures for improving the nutrition situation, it nevertheless is necessary to insist that a remedy be found, and public

ignorance and indifference have to be stimulated into demand for action.

Nutrition surveys in themselves would be fairly useless if this did not serve to stimulate governments to a more vigorous application of remedial measures. Having, however, obtained an idea of the probable percentage incidence of malnutrition in a community or country, we might as well go one step further and *use our so-called normal* (*undiseased and adequately nourished*) *subjects for the determination of normal nutrition values for the various segments of the population systematically investigated by us*. This at least seems to be a constructive way of setting about the nutrition problem of a country. More light on the whole concept of Normality or Adequacy in Nutrition is badly needed.

SUMMARY

It is argued that correct or more satisfactory assessment of the nutritional status of humans required, in the first instance, reliable standards of measurement or 'yard-sticks' based on the concept of what *normality* really constituted.

Besides concentrating somewhat exclusively on the determination of the extent and nature of malnutrition present in a population-group or community, and on the application of suitable remedial measures, greater use for research should be made of the so-called normal subjects, in order to fill certain gaps in our present knowledge concerning normal nutrition standards.

Great importance is attached to clinical examination, which should, in the first instance, not be employed chiefly as a means of appraising or selecting under-nourished individuals, but rather to exclude, as far as possible, active disease or pathology as a possible 'conditioning' factor for improper absorption or utilization of food in the body even when the diet is satisfactory.

Diseased subjects, having been screened off, the balance of the group may then be further divided into (*a*) individuals who are undernourished not because of the presence of any obvious disease but merely through lack of enough and/or proper food, and (*b*) so-called normal persons (apparently healthy and adequately nourished).

The usefulness is discussed of including other methods to *supplement* the clinical, such as socio-economic and other dietary investigations, together with somatometric and laboratory methods.

Acknowledgment is due to the Secretary for Nutrition for permission to publish this paper.

REFERENCE

Brock, J. F. and Latsky, J. M. (1943): *The Recognition of Human Malnutrition*. S. Afr. J. Sci., **40**, 271.

SPEECH THERAPY AS A HOSPITAL SERVICE

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Man's ability to communicate is taken too much for granted. It is only when this ability to communicate is seriously impaired that attention is drawn to it. Inability to communicate freely will lead, in many instances, to serious educational and vocational crises, and may cause emotional disturbances and give rise to family difficulties. The question then arises—what is to be done for the patient?

Every large General Hospital should provide adequate facilities for the diagnosis and treatment of the various problems of communication with which the medical staff are frequently confronted, whether the origin be congenital (e.g. cleft palate), developmental (e.g. retarded speech development), the result of disease (e.g. voice weakness following laryngofissure), or traumatic (e.g. aphasia).

A Speech-Therapy Department offers the following services:

1. *Diagnostic Consultations*

The diagnosis of the type of problem, whether of speech, language, voice or hearing, presented by the patient, together with recommendations for the handling and treatment of his case.

In order to assess the patient's specific problem of communication various tests and examinations are employed. These include:

(*a*) Phonetic Inventory Test, designed to test the patient's ability to articulate each speech sound when used at the beginning, middle and end of words, e.g. T in Tie, wriTing, haT.

(*b*) Linguistic Assessment, to ascertain the patient's level of language ability in relation to his chronological age. In cases of cerebral damage, the purpose will be to assess the facets of language which have been retained and those which have been disrupted.

(*c*) Examination of the Speech Mechanism—a complete assessment of the structure and function of the organs of speech. This will include the mechanisms of respiration, phonation, articulation and resonance. Abnormalities of any one or a combination of these may give rise to a disorder of communication.

(*d*) Hearing Tests, carried out whenever a hearing loss, however slight, is suspected. Hearing loss inter-

feres with the reception of speech and thus impairs communication. It may also prove to be a causal or contributory factor in disorders of articulation and distortions of vocal patterns.

(*e*) Laterality Tests, carried out in order to ascertain eye, hand and foot dominance. Confused or changed dominance may be a contributory factor in some cases of retarded speech development and stuttering, reading and writing difficulties.

(*f*) Non-verbal Intelligence Tests, particularly important since they rule out low scoring due to speech and/or hearing impairments. Many diagnostic errors have been made in the past by accepting as valid the results of verbal intelligence tests for patients with speech and/or hearing disabilities.

(*g*) Assessment of Educational Quotient, particularly important in cases where brain lesion is the cause of the distorted communication. Regular assessments will indicate whether or not deterioration is taking place. These tests are applied to children who have received some education before the brain lesion occurred, and to adults whose pre-morbid level of intelligence and education was normal.

(*h*) Observations of Emotional and Social Maturity, and Hand-Eye Co-ordination, particularly important as a lead to diagnosis in the pre-school child.

2. *Specific Tests to Aid Medical Diagnosis*

The aids most frequently requested to assist medical diagnosis are measurements of Intelligence and Hearing. Further tests that are beginning to come into their own are those designed to measure fine phases of mental deterioration following brain damage.

3. *Treatment of Disorders of Communication*

The aim of treatment is not necessarily *normal* communication but, rather, the best communication of which each individual patient is capable.

4. *Regular Follow-up After-Treatment*

Most departments follow up their patients after discharge at regular intervals, to assess the long-term results of treatment. It is then possible to institute further short periods of therapy at the most appropriate times, should these be necessary.

Patients handicapped by disorders of communication generally reach the Speech Therapy Department by referral from the Paediatric, Ear, Nose and Throat, Neurological and Neuro-surgical, Medical and Plastic Surgery Departments.

PAEDIATRIC DEPARTMENT

1. *Defects of Articulation*

These are substitutions, omissions and distortions of consonant sounds which render a child's speech difficult to understand, thus impairing his chances of adequate education and social adjustment. In other words, the child's speech pattern is inferior to the norm of speech development for his chronological age. The *causes* are:

(*a*) Poor auditory memory.

(*b*) Some degree of hearing loss in the speech frequency range, either permanent or transient, during the critical early stages of speech development.

(*c*) Malocclusion or other dental irregularities.

(*d*) Poor co-ordination of the speech musculature. It is possible that in some cases this is resultant from the development of abnormal sucking, chewing and swallowing reflexes in infancy and early childhood.

Treatment. Prophylactic measures can commence with advice to parents any time from about 2 years of age, whereas the child is unlikely to be accepted for individual or group treatment until 3 or 4 years old. Prognosis in most cases is favourable, and is dependent upon the cause, the severity, and the home background.

2. *Delayed Speech Development*

This is the delay of the onset and development of speech beyond the age at which commencement is expected, in a child who exhibits normal comprehension of language. The *causes* are:

(*a*) Psychological:

(i) Lack of motivation. If there is no desire to speak on the part of the child, speech development will be delayed; if his wants are continually anticipated there will be no need to express himself through speech.

(ii) Lack of stimulation. In cases where long periods of hospitalization occur during critical stages for speech development, linguistic delay is common. This has frequently been seen at the Transvaal Memorial Hospital for Children, where the paediatric services make wise provision for this problem by insisting on the services of a speech therapist.

(*b*) Shock due to trauma.

(*c*) Mental retardation.

Treatment. Parent counselling should be instituted as soon as possible together with stimulation of the latent speech processes through the various sensory channels. Mentally retarded children are rarely accepted for treatment in a busy department though advice may be given to the parents as to how best to stimulate speech at home.

3. *Stuttering*

Many controversial theories concerning the etiology of this common problem have been advanced, but no definite cause has been scientifically established to date.

Treatment. Prophylactic treatment during pre-school years gives the best prognosis. Parent counselling to eliminate the precipitating factors is usually undertaken immediately. The prevalent fallacy that children 'grow out of it' is strongly condemned. It should also be pointed out that such advice as 'take a deep breath before you speak', 'talk slowly', and 'start over again' precipitate or worsen the condition in the majority of cases. Older children and adults may require psychotherapy in conjunction with speech therapy.

4. *Acquired Disorders of Communication*

The treatment of tuberculous meningitis may result in complete or partial deafness. This in turn will lead to difficulty in understanding speech, and to a deterioration of speech and language ability, unless immediate steps

are taken by the speech therapist to preserve these processes.

Encephalitis often has the effect of bringing speech development to a standstill. Mental deterioration may result and behaviour disorders are common. Speech therapy may be attempted but the prognosis is often questionable.

Epilepsy. Speech delay may be associated with this condition in young children. Older children may exhibit a syndrome of sluggish articulation. It has been suggested that this may be due to the heavy sedation. Dyslexias are fairly common among these children and respond to treatment.

Diphtheria sometimes leads to paresis of the soft palate and/or laryngeal musculature. In the former the result is nasal speech and in the latter, breathiness and huskiness. These conditions generally improve with speech therapy.

EAR, NOSE AND THROAT DEPARTMENT

1. *Laryngectomy.* The laryngectomized patient can be taught to speak again by means of the acquisition of oesophageal or pharyngeal voice. Generally speaking the best results are obtained when the patient is seen by the speech therapist before the operation. Treatment should commence as soon as the wound has healed and before discharge from hospital. The patient has been deprived of the ability to phonate, but articulation remains intact. A new sound-producing mechanism must therefore be brought into operation. The patient is taught either to trap air in the pharynx and release it, causing vibrations of the pharyngeal walls and thus producing sound, or to swallow air and 'burp'. This 'burp' can be turned into a very acceptable, if slightly husky, voice.

2. *Laryngofissure, Arytenoidectomy and Recurrent Laryngeal Paresis.* Patients with these conditions will show a voice picture varying from complete aphonia to a weak breathy voice, with consequent interference with speech phrasing. In most instances these patients will also exhibit symptoms of fatigue and breathlessness following very slight physical exertion. Therapy is similar for all these conditions; the normal vocal cord is taught to compensate for the removed, fixed or paralysed cord by swinging beyond the mid-line. The development of this function assists the patient to overcome the breathlessness following exertion, in that glottal air-leak is reduced. The prognosis is generally good and treatment usually successful in 4—8 weeks.

3. *Voice Disorders Caused by Misuse of the Vocal Mechanism.* These include vocal nodules, chronic hoarseness with no organic basis, persistent puberphonia with normal development of the larynx, and so on. These disorders are frequently occupational, in that they predominate amongst those who use their voices continually in their work, such as teachers, lawyers, foremen in noisy factories and clergymen. Treatment for most cases begins with a period of complete voice rest, followed by gradual training in correct voice production for their occupational needs.

4. *Partial Deafness.* Cases of auditory deterioration with a poor medical prognosis can be assisted to understand speech by the teaching of lip-reading, acoustic training, and the adequate use of hearing aids.

A modern method of teaching lip-reading is by means of films. Patients are given training in watching the speech patterns of different people, and should be tested continually for efficiency of understanding throughout the course.

One of the latest trends in aural rehabilitation is the use of acoustic training. This is especially necessary in the patient's adjustment to a hearing aid. Memory for sound must be stimulated and training in discriminating the various auditory speech patterns through the medium of amplification is very necessary. With most dissatisfied users of hearing aids the reason is that they have not been prepared to enter the world of sound again, and therefore are at a loss to adjust themselves to the different acoustic conditions. Auditory training has often proved successful in cases of nerve deafness. A distorted sound pattern due to frequency loss is heard; the patient can be trained to make sense of this through various listening exercises, and thus make more effective use of his residual hearing.

5. *Disorders of Nasal Resonance and/or Distorted Articulation.* Various conditions such as gross adenoids and chronic catarrh and allergies, occuring during the early years of speech development and persisting for any length of time, are liable to disturb the acquisition of normal speech. Mouth breathing is enforced, which results in lack of tone of the speech musculature, and may lead to tongue protrusion and the associated distortions of consonant sounds. Transient periods of impaired hearing which sometimes accompany such conditions may account for the incorrect acquisition of some speech sounds. Deficient nasal resonance is a common feature, but may be replaced by excessive nasal resonance once the condition has been alleviated, due in part to habit and in part to lack of tone of the velo-pharyngeal mechanism. In these cases medical treatment must precede speech therapy, and when it is successful the prognosis for speech is good.

NEURO-SURGICAL AND NEUROLOGICAL DEPARTMENTS

1. *Aphasia.* Most patients referred from these departments are cases of aphasia, which may be of cortical or extra-cortical origin.

In aphasia of cortical origin the prognosis depends mainly upon the patient's age and physical condition and the length of time which has elapsed since the onset. Speech therapy commencing during the period of spontaneous recovery, i.e. during the first 6 months, proves more successful than if referral is delayed. The doctor in charge of this type of case should see that therapy is instituted within a few days of the onset, or as soon as the general physical state will allow. From the Medical Department also the patients most frequently referred are cases of aphasia of vascular origin.

Most cases of aphasia of extra-cortical origin can be rapidly assisted to regain their speech, reading and writing through a simple technique which restores these abilities simultaneously.

2. *Degenerative Neurological Disturbances.* Speech and voice disturbances may result from degenerative

neurological conditions such as myasthenia gravis and parkinsonism. In cases where the condition has been arrested, speech therapy may assist the patient to communicate more adequately.

PLASTIC SURGERY DEPARTMENT

1. *Cleft Lip and Palate.* The function of the speech therapist in the treatment of these cases is threefold:

(*a*) To follow up regularly all cases repaired in infancy and early childhood. The purpose of this is to determine whether speech is developing normally, and to prevent certain anomalies which prove very difficult to eradicate later.

(*b*) To assess pre-operatively the speech of all patients undergoing primary or secondary repairs of the palate after the acquisition of speech. Such assessments may aid the surgeon in his decision as to the best type of operation for the particular patient.

(*c*) To treat all patients whose speech is defective in order to obtain the maximum improvement possible at any one time, taking into account the existing anatomical and physiological condition.

2. *Congenital Short Palate and Submucous Cleft Palate.* These conditions generally pass undiagnosed until adenoidectomy leaves the patient with grossly nasal speech. The speech therapist is often the first to recognize them. Referral to the plastic surgeon for diagnosis and possible treatment is essential before speech therapy can be successful.

OTHER DEPARTMENTS

The work of the Speech Therapy Department is not restricted entirely to referrals from the departments mentioned above. Patients may be referred from any other hospital department. The Orthopaedic Department may refer cases of bulbar poliomyelitis in which cranial-nerve involvement has resulted in huskiness, nasality or sluggish articulation. These aspects of the problem require special consideration in planning the general rehabilitation of such patients.

Occasionally a case of glossectomy will be referred from a surgical department. These cases are comparatively rare, but are mentioned because, in our experience, they are capable of remarkable compensatory adjustments with treatment.

It is often the responsibility of the speech therapist to refer a patient to an appropriate rehabilitation centre, when long-term general re-education is necessary in addition to speech therapy. This is true in many cases of deafness and cerebral palsy when they are of such a degree as to require special educational techniques and vocational guidance. The success of the rehabilitation of each case is dependent to a large extent on the co-ordination of all the various types of treatment required for any one patient. The speech therapist in a hospital service is a member of a large team, whose aim is to restore the individual to society as an adjusted human being, able to realize his potentialities.

EXPERIENCES WITH ULTRASONICS

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In the past 18 months I have personally administered over 3,000 ultrasonic treatments using one type of machine. During this period I have received an increasing number of inquiries on the subject.

The *symptoms* of patients referred to the Specialist in Physical Medicine fall mainly under a twofold classification, viz. *pain* and *disability*; usually both complaints are present but sometimes only one. Likewise the *pathology* is also twofold, viz. *traumatic* and *rheumatic*, often one feature occurring but sometimes both.

The Physical Medicine Specialist, having taken the history from the patient and made his examination and pertinent investigations, determines the diagnosis before proceeding to prescribe from the vast armamantarium at his disposal, which includes various forms of heat, high-frequency and low-frequency currents, actinotherapy, hydrotherapy, massage, kinesiatrics, spinal traction, intermittent venous occlusion and occupational therapy. To these forms of treatment is now added—ultrasonics.

Historical. During 1917 ultrasonics were used experimentally in Germany and were found to have biological effects.[1] Later, when the country was being ruled by megalomaniacs, it was hailed—as being a wonder cure for most conditions—from an ingrowing toenail to an exostosis of the skull. However most writers seemed to agree that it was of great value in the treatment of varicose and indolent ulcers.

It was then handled in the U.S.A.—probably in too big a way—for adverse reports were given stating that necrosis of tissue and irreversible changes in nerve tissue had been produced. Thereafter it was tried in Great Britain, where it was stated to be useful in the treatment of ankylosing spondylitis.

Nature and Generation. Ultrasound consists of mechanical vibrations beyond the range of human audition and therefore of a frequency of more than 20,000 per

second. The particular machine I used propagates 800,000 cycles per second of continuous unmodified oscillations. These are generated by passing a high frequency current onto a natural quartz crystal which consequently vibrates and produces ultrasound. The penetration varies according to the type of tissue it has to traverse but the intensity decreases to about ½ its value at a depth of 1—1½ inches. It is completely absorbed in air or gas. The transducer applicator I use has an area of 7 sq. cm., all of which radiates ultrasound.

USE IN MEDICINE

The effects [2] of ultrasound are:

1. *Mechanical.* These include the disintegration of crystalline solids, and sometimes of colloidal particles, with their emulsification; the coagulation of fogs, smoke and some emulsions; and the degassing of liquids. Cavitation results when the disruptive forces engendered break through cohesive bands between molecules of a liquid, a gas, or even certain colloids or solids. The cavities are immediately collapsed by the succeeding compressive phase of the sound vibration plus atmospheric pressure.

2. *Thermal.* Heat is generated in any medium by ultrasound, the amount depending on the energy absorbed. The amount of heat produced and the region of maximum heating are influenced by the nature of the medium, the presence of dispersive elements, colloidal particles and precipitates, and reflection at interfaces of matter. Higher sound-frequencies generate more heat per unit of energy and time. If cavitation occurs it is accompanied by considerable heat production. The heat released in living tissues is localized and there is normally rapid removal by the circulation, conduction and radiation. Ample evidence of damage to tissues has been demonstrated when ultrasound in overdoses is applied to epiphyses, fascia and muscle.

3. *Chemical.* These are oxidation, luminescence, depolymerization, hydrolysis and inversion of sugar.

4. *Biological.* The following are some of the actions and theories regarding this aspect of ultrasound:

(*a*) It produces heat [3] (this I found to be very mild, rather a warmth).

(*b*) It acts as a micro-massage [4] (I believe this to be one of its functions).

(*c*) There is a subsequent hyperaemia and vasodilation.[5]

(*d*) It has a sedative action on neural tissues,[6] relieving pain either directly or *via* the sympathetic or parasympathetic systems (I found this to be so).

(*e*) An antispasmodic and muscle-relaxant effect is produced [7] (to a minor degree).

(*f*) It hastens regeneration of the dermis (definitely).

(*g*) It softens collagen tissue (this action is usually of a temporary nature).

(*h*) It has an iontophoretic action [8]—this I confirmed through the preliminary application of histamine before using the transducer. Local and general reactions followed. Such reactions may be the explanation of the sedative effect on nerve tissue, for when the galvanic current is used on pathological peripheral nerve tissue it assists the positively-charged and negatively-charged ions on either side of the nerve sheath to return to normal.

Ultrasound has been used as a *diagnostic* medium.[9] Its radiation is transmitted through the parts of the body to be examined. The transmitted energy establishes oscillations on an ultrasonic receiver applied to the opposite surface of the body and the energy thus obtained is transformed into a picture by photo-electric procedures. This method, called 'sonography', has demonstrated the cerebral ventricles and may in future replace the present more dangerous ventriculography and encephalography.

AUTHOR'S EXPERIENCE

From my personal experience with the machine used I give the following particulars of treatment and dosage:

The *technique* employed was a direct labile application either with liquid paraffin as a lubricant or with the part of the body to be treated immersed in water.

Intensity. The best I found to be about 1 Watt/sq. cm. Not more than 3 Watts/sq. cm. were given. There must be no discomfort to the patient.

Duration. A period of 10 minutes seems to be about the optimum time. Not more than 15 minutes were allowed.

Interval. Daily treatments are advised.

Number of Treatments. As many as 15 to any part seems to be the limit of response. The maximum number used was 20. Should there be no satisfactory response by the 3rd application then there is little reason for persisting.

Advantages. The treatments are of short duration. The patient does not become overheated. No discomfort is produced.

Overdosage. With an overdose a sensation of pain develops comparable to that experienced when receiving a hammer blow upon a finger nail. There is thus the possibility of ultrasonia being used in the future for the estimation of pain thresholds.

Contra-indications. Certain of these are mentioned [10] in relation to:

1. The eye (I believe such contra-indications to be reliable).

2. Brain tissue (I found ultrasonia caused no ill effects).

3. Growing epiphyses (I treated adults only).

4. Gravid uterus (such cases did not come under my care).

5. Tumours (no tumours were treated by me).

6. Lower cervical sympathetic ganglia (there were no adverse reactions).

7. Precordium (patients took this well).

8. Acute infections. Considering the theories there would appear to be contra-indications, although I have not encountered any mention in the literature. However I tried ultrasonia in a case of cellulitis and in one of palmar-space infection, with poor results.

As two features of this treatment are generally accepted, viz. the remarkable response of skin ulcers and the anti-ankylosing effects, I thought ultrasonic therapy

would be ideal for trauma of soft tissue and I have found this to be the case.

The following list gives some idea of the various conditions treated and the responses:

1. Trauma of soft tissues. Sixty per cent of my cases were of this class and in these the best results were obtained. They included contusions, lacerations, haematomata, wounds, sprains, scar tissue and keloids.

2. Osteo-arthritis of hip, 2 patients, over 50 years old; both obtained relief from pain and increased function.

Osteo-arthritis of spine, 4 patients, middle aged: 2 obtained some relief and the others showed no improvement.

Osteo-arthritis of shoulder, 2 cases, over 50 years old; both showed definite improvement.

Osteo-arthritis of hands and wrists, 2 cases, aged 30—40 years; both obtained some relief.

3. Amputation stumps with neuromata and causalgia, 2 cases; both obtained amazing relief of pain. Since percussion is a recognized form of therapy it is not unnatural that I accepted the micro-massage theory of ultrasonic action.

4. Metatarsalgia, 3 cases, over 40 years of age; all very successful (2 responded only to this modality).

5. Fibrositis. These cases constituted 20% of the patients treated. About one-fifth of them felt that ultrasonia was superior to other physical measures.

6. Neuritis due to pressure syndrome. In 8 cases temporary relief of pain was obtained but other physical methods, e.g. traction, proved superior.

7. Supraspinatus syndrome. In 6 cases there was an excellent response.

8. Ankylosing spondylitis, 2 cases in an advanced stage, with histories of 15—20 years; both showed immediate increased neck mobility and feeling of comfort.

9. Rheumatoid arthritis. In 1 case—very advanced—temporary relief was obtained.

10. Sinusitis. Ultrasonic therapy was tried in 2 cases, and was found to be of no value.

11. Asthma. In 1 patient ultrasonic therapy to dorsal spine was tried and was found not to be helpful.

As a result of this experience I have come to the following conclusions:

1. Ultrasonia has a place in physical medicine.

2. It is most effective in soft-tissue trauma, the supraspinatus syndrome, and ankylosing spondylitis.

3. Treatments should be in the hands of persons suitably qualified and acquainted with physical therapy.[11]

4. The use of ultrasound is in its infancy and is destined to be placed on a surer footing.

I wish to thank Mr. N. Garber for his very kind perusal.

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TWO UNUSUAL CASES

1. INTERNAL FISTULA

2. FOREIGN BODY IN DESCENDING COLON

H. F. LOWENTHAL, F.R.C.S. (EDIN.)

Kimberley

Internal fistulae associated with trauma, chronic infection, Cröhns disease and neoplasms are relatively common, but as far as I can find out, from the literature at my disposal, those associated with old-standing appendix abscess are not described.

The following case in which the appendix abscess was of 12 years' standing, demonstrates such condition Mr. A. S. consulted me complaining that he had had diarrhoea for the past 12 years. The symptoms commenced in 1942, whilst he was an internee, with a severe attack of abdominal pain, with vomiting, which was followed a day or so later by the passing of many foul-smelling stools accompanied by blood and mucus. For this condition he was given some medicine. The pain subsided, but the diarrhoea has continued, unabated, up to the present time. The number of stools passed on a good day was 5, and during acute exacerbations, as many as 20—30 a day. During this period he had steadily lost weight. He found that if he ate root vegetables and stale bread he was more comfortable, whereas meat and eggs worsened conditions considerably.

When he presented himself to me for examination he looked older than his years and was thin and wasted.

Physical examination revealed very little abnormality, except some tenderness of the lower abdomen and slight distention. Rectal examination was quite impossible, on account of intense pain. His blood pressure was 128/60 mm. Hg., and the blood count was within limits of normal, with relative leucocytosis.

Under general anaesthesia sigmoidoscopy was undertaken. The rectal mucosa was congested and a large polyp was seen 9 inches from the anus. Biopsy of this

was performed and the pathologist was extremely surprised when section of the polyp showed it to be a portion of the appendix with chronic inflammatory changes. As a result of this finding and because of his general deterioration following this biopsy, laparotomy was advised.

The patient was prepared by giving him intravenous infusions, daily bowel wash-outs for 5 days, and a course of sterothal. For 2 days before operation he was given streptomycin, ½ g. b.i.d.

The abdomen was opened under general anaesthesia through a right para-median incision, when it was found that there was a large appendix abscess, with the appendix perforating through the rectum, which in turn connected with a fairly large hole in the ileum. The abscess cavity communicated with the hole in the ileum. The appendix was removed, a piece of the ileum was resected and side-to-side anastomosis performed. A portion of the rectum was removed and this showed a small knuckle of the appendix still protruding into the cavity of the rectum.

CONCLUSION

It would seem that this man must have developed an appendicitis 12 years ago with adhesion of the tip of the appendix to the rectum. On the medial wall of the abscess was a loop of ileum into which this abscess must have drained. That such a state of affairs could carry on for 12 years seems hardly believable.

LODGEMENT OF FOREIGN BODY IN DESCENDING COLON

Mr. N., aged 36 years, complained of pain in the left side of his abdomen, colicky in type, with nausea but no vomiting, which had commenced 16 hours before his consulting me. His bowels had not acted for 36 hours and he said that he felt sweaty and ill.

On examination, his temperature was 100°F, pulse rate 120 per minute. Marked voluntary guarding of the left side of his abdomen was apparent with finger-tip tenderness over the 'left McBurney's point'. Dextrocardia and/or transposition of viscera was excluded. Expectant treatment was instituted, when 3 hours later there was a sharp deterioration in his condition and it was evident that a frank peritonitis had ensued. The pulse rate had jumped to 140 and the temperature dropped to 99°F. Laparotomy was advised and a provisional diagnosis of Meckel's diverticulitis was made.

The abdomen was opened under general anaesthesia through a right para-median incision and exploration commenced. The appendix itself was normal. A Meckel's diverticulum was found, but was quite blameless. However, a large abscess was found in the neighbourhood of the left para-colic gutter about 3 inches below the splenic flexure, and at this point a large thorn was found to have perforated the colon with resultant abscess formation and peritonitis. As there was thrombosis in the vessels in this neighbourhood, and as portion of the colon was gangrenous, excision of a segment of the bowel was undertaken.

CONCLUSION

Although lodgement of foreign bodies in the oesophagus, at the pylorus, at the ileocaecal valve, and at the anus, are comparatively common occurences, foreign bodies lodging in the descending colon must be rare.

ASSOCIATION NEWS : VERENIGINGSNUUS

RUBELLA IN PREGNANCY

DR. LEON VERCUEIL'S PRESIDENTIAL ADDRESS AT ANNUAL MEETING OF SOUTHERN TRANSVAAL BRANCH

To open this paper it will be apt to repeat a quotation of Swan's:*

> 'This is the foul fiend Flibbertigibbet; he begins at curfew and walks till the first cock; he gives the web and pin and squints the eye, and makes the harelip, mildews the white wheat, and hurts the poor creature of earth'. *Shakespeare.*

In one of his most subtle manifestations Flibbertigibbet stalks unseen in the guise of rubella, by day as well as by night, in the house, the schoolroom and crowded places, quite unsuspected and unfeared. With malevolent cunning he makes his main attack upon the embryo realizing that months will elapse before the result of his perfidy are discovered and that it was unlikely that anyone will connect a trivial illness in the mother with severe congenital anomalies in the next generation. Emboldened, however, by the fact that his misdeeds had remained undetected for so long, he became over-confident and was detected when, in 1939 onwards he attacked an excessive number of susceptible pregnant women in Australia. In consequence, in 1941, an unusual number of cases of congenital cataract were observed in Sydney enabling Gregg, with brilliant clinical acumen and epidemiological insight, to realize the significance of the phenomenon, and to unmask the miscreant 'Flibbertigibbet in yet another of his manifold guises'.

A number of other investigators afterwards confirmed Gregg's observations and found that the affected infants not only suffered from congenital cataracts, but also from deafness, congenital heart disease, and mental retardation.

Until 1941 rubella was considered a benign and unimportant disease of childhood—in fact a 'nuisance disease'—but now it is recognized to be a grave public-health and social problem, and having been indicted as the cause of congenital malformations in newborn infants is anything but a mere nuisance for the pregnant woman who contracts it.

Newspapers and journals have dramatized the potential crippling effect of rubella in the newborn. The hazards of the disease are held out to the public, and a great deal of anxiety generated.

Since reading articles in the *Readers Digest* and other publications about the baneful effect of rubella on the foetus in the first few months of pregnancy, many parents have found convenient excuses for having produced malformed or mentally retarded children.

For rubella in the pregnant woman or in a contact of hers a correct diagnosis is essential; an erroneous diagnosis may create unnecessary problems and complications because of the fear that the child may be born deformed or stillborn.

Since Gregg first drew attention to congenital cataracts caused by rubella in pregnancy, it has been found by investigators that a large number of other abnormalities are also caused by the same agency. The most important malformations are: mental deficiency or retardation (including mongolism), hydrocephalus (Fox and Bortin, 1946), microcephaly, myelocele, spina bifida occulta, cleft

* Swan, C. (1949): J. Obstet., Gynaec. Brit. Emp., **56**, 342.

palate, obliteration of bile ducts (Swan *et al.* 1944), bilateral talipes, imperforate anus, unilateral Horner's syndrome and hemiparesis, spastic deplegia, epilepsy, strabismus, cryptor-chidism, buphthalmos, hypospadias, genu valgum (Swan *et al.*, 1943, Swan and Tostevin, 1946). Many of the affected children have several of these defects. Delayed eruption, hypoplasia of enamel and caries are fairly common dental anomalies. Stillbirths, abortions and premature births have also been observed.

The birth weight of affected children Australian and American investigators have found to be low. It is usually under 6 lb. and many of the children have difficulty in feeding, and are late in sitting up and walking. Retardation in physical development has been found to be maintained as the children grew older; many remained stunted in stature.

In 1946 Swan, Tostevan and Black remarked: 'With few exceptions the malformations are reproductions of varying degrees of completeness of a specific syndrome, comprising cataract, deaf-mutism, heart disease and microcephaly. This complete syndrome is uncommon, as cataract and deaf-mutism are scarcely ever encountered together.' The commonest types of defects consist of deaf-mutism or cataract alone or in combination with one or both of the two remaining components of the syndrome.

AUTHOR'S PERSONAL EXPERIENCE

About 25 years ago I attended the confinement of a Mrs. van R., who had had rubella in the first trimester of pregnancy. The baby, a boy, had congenital cataracts of both eyes and was puny and somewhat mentally retarded when he grew up. At the age of about 8 years he was operated on for his cataracts, but was never able to see well, even with the aid of glasses. I afterwards attended the mother at the birth of 4 more children, all of whom were unaffected. Years later when I first read about the effect of rubella on the foetus in early pregnancy I recalled the fact that Mrs. van R. had had rubella in the first trimester of pregnancy.

In about 1944, before the lay press commenced publicizing the danger of rubella to the foetus, I was called to see a couple of children, in a family, suffering from rubella. They had an older brother of about 15 years, who was severely mentally retarded and who also had strabismus. The mother casually remarked that she herself had had rubella, when carrying this son, and on closer questioning she was able to supply the information that it was within the first 4 months of pregnancy.

PERCENTAGE RISK

Estimates of the risk of congenital malformations from rubella in first trimester of pregnancy vary from 10 to 90%. The many reports which have yielded this wide difference in percentage are of two types, retrospective and prospective. The earlier data were mainly accumulated by the retrospective method, from various unrelated studies in Australia, England and America.

Retrospective Studies. Wesselhoeft in 1947 summarized 521 congenitally deformed and 52 normal babies born of rubella pregnancies. This suggests a 90% risk. His review of rubella in 1949 increased the number of congenital deformities to 656 and of normal babies to 124, the percentage thereby being reduced to 80.

Prospective Studies. Studies conducted by selecting the cases before the children are born indicate that the risk of congenital malformation and stillbirths are much lower.

Ingalls and Purshottam from their own cases pooled with others estimated the risk at 17%. Greenberg, in New York, collected 83 cases complicated by rubella in the first trimester of pregnancy. Of these 9 were stillbirths, and 5 were congenitally defective, yielding a total of 14 affected infants or nearly 17%. Landstrom's figure from the Swedish epidemic of 1951 was also about 17%.

Fox and Bortin surveyed 22,226 cases of rubella notified in Milwaukee during 1942-44. There were 11 pregnant women who had rubella, of whom 2 gave birth to abnormal children, both cases of hydrocephalus; the other 9 bore normal children (7 had rubella in the first 4 months of pregnancy, one in the 7th month and one in the 9th.

Aycock and Ingalls in Massachusetts found that out of 1,300 rubella cases reported 4 developed the disease in pregnancy. Two of them had rubella in the 2nd month and the child of one of these suffered from mental retardation; the other 3 children were normal.

Ober and his associates made a survey of 54 cases of rubella in pregnancy. They found that 37 gave birth to normal infants and 8 to infants with congenital defects; 9 of the pregnancies ended in abortion, miscarriage or stillbirth. Combining the 54 cases of these investigators with those of Fox and Bortin, the proportion of the children lost or defective was: Rubella in the 1st trimester, 50%; in the 2nd trimester and 3rd trimester, each 14%.

Patrick by means of a questionnaire concerning 6-year-old children attending school in Queensland in 1947 was able to have 129 children examined whose mothers had had an attack of rubella during pregnancy. From his survey he concluded that the risk of a mother producing a congenitally defective child after rubella in the 1st trimester of gestation was 49·2% and in 1st 4 months 49·4%. This survey suffered from the defects that direct questions were asked whether mother had had rubella or not, and that it took no cognizance of children who were so mentally retarded that they did not attend school or whose congenital defects were so severe that they had not survived.

Gregg in his first series of 78 cases found that 19% had died early in postnatal life, and Swan *et al.* about 19%. The statistical evidence is of greatest value if the cases are selected before the child is born. Otherwise there is a tendency to report tragedies and overlook unaffected infants.

From the figures available it is impossible to state a precise figure for the risk to the child after rubella in the 1st trimester. Australian experience points to a high percentage, Swedish data, from a controlled study, to a lower range (probably not more than 15%).

Krugman and Ward state that the risk following rubella in the 2nd and 3rd trimesters of pregnancy does not appear to be significant.

It has been suggested that the larger number of abnormalities in Australia were caused by a more virulent type of rubella. Nevertheless patients who have had mild attacks of rubella have produced children with severe types of abnormalities.

Death of Foetus. Besides congenital malformations following rubella in pregnancy there is also a risk, perhaps as great as 20% of abortion, miscarriage or stillbirth. This is a less serious problem psychologically and sociologically. The parents start again with the slate wiped clean; and after abortion the mother who has had rubella is relieved of the worry that her infant may be deaf, blind, mentally retarded or otherwise abnormal.

Swan has envisaged two mechanisms which may bring about the death of the foetus: (1) direct action of the virus or the indirect effect of the concomitant pyrexia, and (2) the production of congenital anomalies of such character as to interfere with the viability of the embryo so that it either dies before term or is unable to survive labour. Depending on time of death of foetus an abortion, miscarriage or stillbirth would result.

STAGE OF PREGNANCY WHEN RUBELLA IS MOST DANGEROUS

Australian investigators have claimed that 90% of women affected with rubella in 1st trimester of pregnancy give birth to abnormal children, 30% in the 2nd trimester and 11% in the 3rd trimester. These statistics in 2nd and 3rd trimesters are far too high.

Gregg, Swan and Tostevan (1946) and others, have reported cases where mothers contracted rubella before conception and gave birth to an abnormal child. Gregg in 1941 reported a case where the mother contracted rubella 3 months before pregnancy.

Gregg in his original paper noted that the mothers had contracted the disease early in pregnancy, mostly in the 1st or 2nd months.

Swan and his associates found that the 'critical period' for the development of congenital defects was within the first 3 months of pregnancy. Subsequently the upper limit of the 'critical period' was extended to the end of the 4th month; this conclusion was based on a total of 558 cases of malformations.

Types of Anomaly

Aycock and Ingalls from a study of the findings of a number of investigators found that the average period of pregnancy when rubella occurred was as follows: for cataract 6 weeks, for deafness 9 weeks, for cardiac abnormalities 5-10 weeks, and for deformed teeth 6-9 weeks.

In 1946 Swan and Tostevan stated: 'The obvious conclusion, however, is that in man the primordia of the various organs have relatively long so-called "critical moments". Our experience suggests that in general the "critical moment" of the optic cup is the first 3 months of pregnancy and that of the cochlea anlage is the 2nd, 3rd and 4th months. We believe, however, that averages such as we have drawn above may indicate the period of greatest

susceptibility of the anlage of a particular organ, for example lens or cochlea to the virus of rubella'.

Fasser of Pretoria, writing on deaf-mutism,* points out that rubella in 1st 4 months of gestation may be followed by deafness in the child, apparently due to defective development in the organ of Corti. He also points out that mental deficiency, microcephaly, and cardiac lesions are often associated with post-rubella deaf-mutism; unilateral or bilateral ocular defects may also be associated with deaf-mutism if the mother contracted rubella within the first 2 months of pregnancy.

Some Australian and American investigators have considered the possibility of an increased virulence of the disease, and believe that abnormalities in the children are the immediate consequence of the passage of the virus through the placental barrier from the maternal to the embryonic tissues. If this theory is true the abnormaltiy produced depends on the virulence of the organism, as well as the stage of reactivity of the host. Particular tissues of the embryo through their more rapid growth at certain period of development, are more vulnerable to an attack of rubella.

In cases where the mother had contracted rubella before conception, either the virus may have been reactivated on conception or the products of abnormal metabolism resulting from the inter-action of the virus and tissues have remained in the body, able to act on embryonic tissues and produce abnormal development. It is difficult to explain how one eye may be grossly affected, and the other unaffected.

In their experiments with trypan blue on the pregnant rat Gillman, Gilbert and Spence have found that some of the embryo may be malformed and other seemingly unaffected.

Congenital Abnormalities in the Rat

Gillman, Gilbert and Spence† drew a parallelism between the production of congenital defects through rubella in pregnant women, and the injection of trypan blue in rats. Their experiments with trypan blue was a significant advance in experimental mammalian teratology. They were able to control the mode of application, the intensity and the spacing of the stimulus accurately, whereas in rubella the growth of the living virus cannot be determined.

Trypan blue produces numerous abnormalities in the pups of rats. By appropriate manipulation the incidence of malformations was increased to 80%. The authors demonstrated that trypan blue is excreted through the milk. May metabolites not gain access to the infant through the mother's milk and aggravate a condition which was not clinically manifest at the child's birth?

In the absence of positive information relating to the passage of virus through placenta, they suggest that rubella and other mild infections produced their effects on the human embryo in a manner similar to trypan blue in the rat. As a result of their experiments it will be interesting to watch the career of apparently normal infants born to women who contracted rubella in the early months of pregnancy.

Other Virus Infections

Aycock and Ingalls conclude that other infective maternal illnesses may give rise to congenital anomalies. The birth of mongols they associate with maternal illness at the 8th week of pregnancy. They also associate maternal infections with other congenital anomalies such as imperforate anus, webbing of fingers and toes, and cleft palate.

Nature of the Rubella Prevalent in Australia

Gregg held that some of the cases diagnosed as rubella might have been 'Woodside throat', which was rife in military camps at the time and consisted of a severe upper-respiratory-tract infection with a toxic erythema, possibly streptococcal in origin. Swan and his colleagues did not agree with this view, but agreed that the rubella was of a more severe character than usual.

The symptoms occurred concomitantly with the rash, though about half the mothers had premilinary symptoms. The patients complained of general malaise, lassitude, insomnia, widespread aching, nausea and vomiting, pyrexia, sneezing, sore throat, post-auricular adenitis. There was a fine pin-point, slightly raised, rash which resembled heat rash or prickly heat, and was pink in colour. Occasionally the rash was pleomorphic. It appeared first on the face and neck, then spread to the trunk and finally to the extremities. It disappeared in 3-5 days. Though the pyrexia in rubella is usually slight, in Australia the temperature rose to 104°F in occasional cases. In a survey by Swan of 118 cases 60 had post-auricular or cervical lymphadenitis and one-third had photophobia or soreness of eyes.

It has also been suggested that the women in Australia were more vulnerable through impaired nutrition and stress and anxiety during the war years.

Artificially induced Rubella

Rubella may be experimentally produced by injecting blood from rubella patients intramuscularly into susceptible subjects, or letting them inhale garglings of rubella patients. It has been proved in this manner that a patient may have rubella without a rash. One of the subjects injected with infected blood became ill, had all the symptoms of rubella, but no rash. His blood injected into another subject produced rubella with a typical rash. The incubation period in the experimentally produced rubella was slightly shortened. An attack of rubella produces a life-long immunity; it has also been noted that children born of mothers who had rubella when pregnant never contracted it subsequently.

CONGENITAL ABNORMALITIES FOLLOWING MATERNAL RUBELLA DURING PREGNANCY

I wish now to deal with a few of the more common anomalies:

Congenital Heart Disease

Wesselhoeft in his series of 521 cases from Australian, American and British literature of congenitally deformed infants born from rubella pregnancies found that 221 showed eye defects, 243 impaired hearing, and 221 congenital heart disease.

Up to June 1949 Swan had collected 274 cases of congenital heart diseases in nearly all of which the mother had suffered from rubella during the first 4 months of pregnancy, mostly in the 1st and 2nd months.

Swan and Gregg noted that cardiac disease was more often associated with cataract than with deaf-mutism.

Good *et al.* stated that cardiac disease may be the sole abnormality.

Gibson and Lewis, of Chicago, closely questioned the mothers of 1,366 private patients with congenital heart disease seen over a period of a few years, and obtained a history of rubella in 17 cases, in which patent ductus arteriosus was diagnosed in 14 cases, 10 confirmed by operation. In 4 of these 10 an additional cardiac malformation was present: coarctation of the aorta was present in one case and septal defects in 2 cases.

In the 3 patients presenting no symptoms or signs of patent ductus arteriosus, one showed marked enlargement of the heart and, on fluoroscopic examination, marked enlargement of the right atrium and ventricle. There was a prominent pulmonary-artery segment together with a hilar dance. The findings were suggestive of a defect of the auricular septum, possibly complicated by mitral stenosis. In another, a diagnosis of a defect of the ventricular septum was made. The 3rd case was the only cyanotic infant in the group: the R.B.C. count was 8,230,000 per c.mm., and a diagnosis of Fallot's tetralogy was made.

The high percentage of cases of patent ductus arteriosus in this small series is very striking.

Gross and Longino in 412 surgically-treated cases of patent ductus found signs suggesting an additional congenital cardiac defect in 24 patients, an incidence of 5·8%. An additional cardiac lesion in 4 out of 10 cases of patent ductus arteriosus following maternal rubella suggests that in this class of case complicating lesions are more frequent.

Other investigators have observed in rubella-pregnancy children cases where, although the clinical findings were negative, a cardiac lesion was found on post-mortem or radiological examination.

Eye Defects

By June 1949 Swan had collected 289 examples of cataract in rubella-pregnancy children. Cases of cataract are practically confined to infants whose mothers had German measles in the first 3 months of pregnancy, mostly the 1st month. Cases of cataract occurring with deaf-mutism were limited to 1st 2 months.

In 150 cases the cataract was binocular, and in 54 monocular. Concomitantly with cataract the following eye defects were noticed: sluggish reaction of pupils to light, difficulty in mydriasis, nystag-

* Fasser, E. (1951): S. Afr. Med. J., **25**, 145.
† Gillman, Gilbert and Spence (1948): S. Afr. Med. J. Sci.

mus of ocular type, optic atrophy, corneal opacities, strabismus, lack of closure of choroidal fissure or foetal fissure.

In the absence of cataract, the most important defect in these cases is buphthalmos; in a few instances microphthalmos occurs and, more rarely, nystagmus, corneal opacity, amaurosis and optic atrophy.

Deaf-Mutism

Swan, Gregg and Tostevan independently discovered this condition following rubella in pregnancy. Up to 1949 Swan had collected 327 cases. The deafness was not absolute and children were able to hear high-pitched, loud, sharp noises. Few heard when spoken to, and very few were able to say a few words. The treatment comprised speech therapy, and hearing aids were used.

Mental Deficiency or Retardation

This has been observed in many cases following rubella in pregnancy. Gregg at first thought all his patients were mentally retarded but later he altered his opinion. Microcephaly has been recorded in 128 cases.

Other defects have been mentioned earlier in this paper.

PREVENTION OF RUBELLA

Gamma Globulin. The Committee on Public Health of the New York County Medical Society reported a controlled study in an institutional outbreak of German measles. Of 133 children who received approximately 0·1 c.c. of ordinary gamma globulin per lb. body weight, 8 developed rubella (6%). Of 129 controls 24 (18%) developed the disease. The Committee believed that gamma globulin was of value in prevention of disease. However, in another experiment on a smaller scale Korn found that the incidence in the control and treated groups was the same. In another experiment with a different gamma globulin 58% of the controls were infected, and 20% of the immunized group. In subsequent experiments there were apparent variations in efficiency of ordinary gamma globulin. In some the difference was not statistically significant.

Anderson and McLornan of Australia prepared gamma globulin from convalescent rubella serum. After reported exposure to rubella 812 pregnant women were immunized with convalescent gamma globulin (424 received 2 c.c. and 388 received 4 c.c.). Only 1% contracted rubella. There were no controls, and the results are therefore inconclusive.

In another experiment 24 volunteers were given 2 c.c. of garglings containing active rubella virus, and after 70 hours certain of them were inoculated with 4 c.c. of convalescent gamma globulin. There was actually a higher incidence in the 'immunized' group.

These experiments then, have not shown that either convalescent gamma globulin or ordinary gamma globulin is consistently effective in preventing rubella.

Active Immunization. When a case of rubella occurs, as many girls as possible should be brought into contact with the case so that they can develop the disease before child-bearing age. The disease can be transmitted by the inhalation of atomized throat washings obtained from patients at the height of the exanthem.

The virus can be preserved for months in washings kept at the temperature of solid CO_2. Camps may be established and girls infected there, so that pregnant women are not exposed to the risk of the infection.

Termination of Pregnancy

Swan and his colleagues in 1943 estimated that, on the evidence then available, nearly 100% of women who contracted disease in the first 2 months of pregnancy gave birth to congenitally defective children, and in the 3rd month 50%. At one stage they recommended that all women suffering from German measles in the first 4 months of pregnancy should have a therapeutic abortion.

To judge from the verdict in the case of Rex v. Bourne there may not be a legal bar to such therapeutic abortion, in view of the mental and physical effects the anticipation of a malformed child may have on the mother. The legalization of therapeutic abortion in these cases may, however, lead to considerable abuse, and one feels that an inordinate number of pregnant women may develop rubella in the first 4 months of pregnancy.

There are a number of considerations which also influence the problem. Each case should be individualized. Some churches are against therapeutic abortion under any circumstances. Others claim that the induction of labour is only justifiable to preserve the life of the mother or child, and there is therefore no justification to terminate the pregnancy on account of rubella.

One can appreciate the point of view of the young married woman who has contracted rubella in the early months of pregnancy and who desires to have her pregnancy terminated for fear of producing a malformed child, in view of the fact that she knows that she may still have a number of pregnancies. An elderly primipara would naturally prefer the risk of producing a malformed child to that of having no further pregnancy; gamma globulin may be given to her and abortion ruled out.

The following statement of Aycock and Ingalls is appropriate: 'Such a far-reacting question can be approached with wisdom only when there are adequate statistical studies to establish the specific risks of infection at all stages of pregnancy. Knowledge from such studies would have to be interpreted not only in terms of acjem risk of congenital anomalies but as well in terms of "the health of the mother" in continuing a pregnancy with such a known risk and finally in terms of an informed public opinion'.

The Defective Rubella-Pregnancy Child as Social Problem

In New South Wales a 'special school' for teaching of 200 deaf mutes has been established. It is felt that for these children boarding schools should be avoided, because it will accentuate the feeling of being 'different'. They should be encouraged to take their place in society.

Naturally when a child is severely mentally deficient, and has in addition ocular signs, he should be removed from the home to an institution, in the interests of the mother and other children in the family.

Women who have born post-rubella congenitally-deformed children often refuse to bear children subsequently, because of the fear that they may produce more congenitally defective children. The public should be educated to realize that this fear is unfounded.

SUMMARY

1. For 14 years rubella has been indicted as a cause of congenital malformations. It also causes spontaneous abortions or stillbirths. If contracted by a pregnant woman during the first 4 months of pregnancy, she may even have a 3 to 1 chance of producing a child with a congenital defect.

2. The main abnormalities are cataract, deaf-mutism, cardiac disease and microcephaly.

3. Termination of pregnancy may be advisable if rubella is contracted in first 4 months of pregnancy. Each case should be considered on its merits.

4. Neither ordinary nor convalescent gamma globulin has proved to be consistently effective in prevention of rubella.

5. Prevention of infection during pregnancy, is considered including deliberate exposure to infection before child-bearing age, and quarantine for patients suffering from the disease.

6. Because of its effect on the embryo rubella has become a social problem.

PASSING EVENTS : IN DIE VERBYGAAN

IV. Symposium Neuroradiologicum. This meeting will be held in London on 13-17 September 1955. Registration will take place on 12 September at the University of London, Malet Street, W.C.1., where the scientific meetings will be held. Radiologists, neurologists and neuro-surgeons particularly are welcome.

Subjects for discussion include (1) cerebrovascular disease, (2) the localization of intracranial tumours by means of isotopes, (3) applications of stereotaxometry, (4) new techniques and (5) various preferred papers on a variety of neuroradiological subjects. Scientific and technical exhibitions are being arranged. It is hoped to arrange a joint half-day session with the 2nd International Congress of Neuropathology, which is being held simultaneously in London.

A full social programme has been arranged including visits to

places of interest for wives and families of members. Application forms and further information may be obtained from Dr. R. D. Hoare, Secretary, Symposium Neuroradiologicum, The National Hospital for Nervous Diseases, Queen Square, London, W.C.1.

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Railway Medical Officers' Group. On the night of 4 March 1955 the Annual Dinner of the Railway Medical Officers' Group (Cape Western Area) was held at the Grand Hotel, Cape Town. The Minister of Railways, and Mrs. Schoeman, and the Local System Manager, Mr. T. V. More, and Mrs. More, were the guests of honour. Eighty-five persons sat down to dinner. In his replying speech to the Chairman's toast, Mr. Schoeman showed an intimate knowledge of Sick Fund affairs and stated *inter alia* that, like the doctors on the Railways, he too had to work overtime, being on duty 24 hours without extra pay or pension privileges. Resulting from this statement, Mr. Schoeman was promptly elected an honorary member of the Railway Medical Officers' Group (Cape Western Area).

* * *

Study of Child Health. The Secretary for External Affairs, Pretoria, has received from the office of the Union's High Commissioner in London a communication stating that the British Paediatric Association is anxious to be of any help in respect of child health in other countries of the Commonwealth, and has offered its services in regard to matters either of policy or of training.

The Association would like to help visitors to the United Kingdom by planning their programmes in advance, and the Secretary for External Affairs has been asked to bring this offer to the notice of the appropriate Union authorities. It is suggested that paediatricians of medical services and of the medical schools might care to get into touch with the Association so that the time of any practitioners who propose to proceed to the United Kingdom to study child health problems could be used to the best advantage.

The address of the Association is British Paediatric Association, The Hospital for Sick Children, Great Ormond St., London, W.C.1.

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Cape Town Paediatric Group. The next meeting of the Group will be held on Friday, 1 April 1955 at 8.15 p.m. in the E Floor Lecture Theatre, Groote Schuur Hospital. The meeting will take the form of a discussion concerning the organization, staffing and running of the new Red Cross Memorial Children's Hospital. As practically all members of the Group have a direct or indirect interest in this subject, a full attendance is requested.

* * *

12*th Annual Golf Competition* '*Jooste Cup*'. Entries are invited from *all members* of the Medical Association of South Africa to play for the above Trophy and many handsome subsidiary prizes. The Competition will be played at the 'E.R.P.M.' Golf Course, Boksburg, over 18 holes, on Sunday 17 April 1955, commencing at 12 noon. Official closing date is 5 p.m. on Monday 11 April. Entries to be posted to Dr. W. Sacks, P.O. Box 813, Springs. Telephone 56-5371 and 56-1138.

POLIOMYELITIS IN THE UNION

Following are the returns, supplied by the Union Department of Health, of cases notified under the Public Health Act as suffering from Poliomyelitis in the period 4 to 10 March 1955.

	European	*Non-European*
Transvaal:		
Johannesburg	2	1
Pretoria	3	—
Pretoria North	1	—
Springs	—	1
Benoni	1	—
Potchefstroom district	1	—
Bethal P.U.A.H.B.	—	1
Boksburg	1	1
Delmas P.U.A.H.B. (Fatal)	—	1
Lydenburg district	—	1
Middelburg district	1	1
Pietersburg district	1	—
Total for Transvaal	11	7
Cape Province:		
Cape Town Mun.	—	2
Cape Town Div. Council	—	1
Umtata Mun.	1	—
Kimberley	2	—
Jamestown Mun.	1	—
East London Div. Council	1	—
Total for Cape Province	5	3
Natal:		
Durban	1	1
Pietermaritzburg	1	—
Nqutu district	—	1
Amanzimtoti	1	—
Pietermaritzburg District (Sweetwaters)	—	1
Richmond	—	1
Greytown district	1	—
Kingsburgh (Doonside)	—	1
Total for Natal	4	5
Orange Free State:		
Kroonstad	1	—
Theunissen	1	—
Total for Orange Free State	2	0
TOTAL FOR THE UNION	**22**	**15**

Union Department of Health Bulletin. Report for the 7 days ended 10 March 1955.

Plague, Smallpox: Nil.

Typhus Fever, Cape Province: One (1) Native case in the Herschel district. Diagnosis confirmed by laboratory tests.

Epidemic Diseases in other Countries:

Plague: Nil.

Cholera in Nagapattinam (India); Chalna, Dacca (Pakistan).

Smallpox in Moulmein (Burma); Phnom-Penh (Cambodia); Ahmedabad, Allahabad, Bombay, Calcutta, Delhi, Kanpur, Lucknow, Madras (India); Cap St. Jacques, Hué, Nhatrang, Saigon-Cholon (Viet-Nam); Mogadiscio (Somalia); Tanga (Tanganyika); Lahore (Pakistan).

Typhus Fever: Nil.

NEW PREPARATIONS AND APPLIANCES : NUWE PREPARATE EN TOESTELLE

'Gill' Liquid Germicidal Soap. Simplified aseptic washing for surgeons and medical personnel is possible with the use of 'Gill' Liquid Germicidal Soap which contains the soap-compatible agent hexachlorophene (also known as G-11).

In order to achieve surgical cleanliness by simpler means than the painful and time-consuming scrub many chemicals have been tested. All these, with the exception of G-11, either lost their activity when incorporated into soap or proved to be too toxic and irritating.

Numerous investigations have shown that G-11 soaps not only reduced the 'resident' bacterial population of the skin by 95% but were also efficient against pathogenic and non-pathogenic organisms. Two-minute washing gave a lower resident count than

20 minutes with ordinary toilet soap, and a 3-minute cleansing without alcohol rinse was superior to the 10-minute surgical scrub.

Furthermore, the hexachlorophene was found to be substantive to the skin so that even after rinsing and washing a residual effective film was retained. All indications show such soaps to be non-irritating and non-sensitizing. A true bactericidal effect is obtained. Hexachlorophene has been found to exert its maximum effect when incorporated in a liquid soap vehicle.

'Gill' soap, the only liquid soap in the Union which contains G-11, was tested extensively by a large National laboratory* and its marked bactericidal effect was demonstrated. In these tests the hands were washed for a definite period and gloves worn for one hour before samples were taken. During this time, simulating actual operating conditions, there was a possibility of extrusion of viable bacteria from the pores of the skin by perspiration. Counts indicate the actual possibility of infection should the gloves be accidentally punctured during an operation. Results were as follows:

Average bacterial counts of standard 10-minute surgical scrubs†	231
Average bacterial counts of 3-minute 'Gill' washes† *(brush for nails, no alcohol rinse)*	11

It will thus be observed that with the standard surgical scrub 21 times more bacteria were present as compared with the 2-3 minute 'Gill' wash.

It was also found that the G-11 in 'Gill' soap was substantive to the skin. This enables surgical cleanliness to be achieved with a single 3-minute wash even after a 2-day lapse, provided the soap has been used for 5 preceding days.

It was concluded that daily routine washings (e.g. at meal times) were effective in reducing the bacterial count low enough to warrant its consideration in medical, dental and veterinary practice and general hospital routine, and in dermatology for the control of pyogenic skin conditions. It should prove an asset in food-handling establishments, in industry as an anti-dermatitis measure, and in establishments wherever there is a danger of infection by contact.

The South African distributors for 'Gill' Liquid Germicidal Soap are Selected Pharmaceuticals (Pty.), Ltd., 81 de Villiers Street, Johannesburg, who will gladly supply literature and samples on request.

* Full details available from distributors on request.

† Results expressed as the number of viable micro-organisms obtained per ml. of the 100 ml. sterile distilled water added to the rubber gloves after use.

BOOK REVIEWS : BOEKRESENSIES

YEAR BOOK OF NEUROLOGY AND PSYCHIATRY

The Year Book of Neurology, Psychiatry and Neurosurgery (1953—1954 Year Book Series). Edited by Roland P. Mackay, M.D., Nolan D. C. Lewis, M.D., Percival Bailey, M.D. and Oscar Sugar, M.D. Pp. 604, with illustrations. $6.00. Chicago: The Year Book Publishers Inc. 1954.

Contents: Part I. Neurology. 1. Introduction. 2. Neurophysiologic Mechanisms 3. Pathology. 4. Exogenous Toxins. 5. Infectious Diseases. 6. Vascular Disturbances. 7. Degenerative Diseases. 8. Metabolic Disorders. 9. Convulsive Disorders. 10. Cranial and Spinal Nerves. 11. Diagnostic and Therapeutic Methods.

Part II. Psychiatry. 12. Introduction. 13. General Topics. 14. Child Psychiatry. 15. Schizophrenia, Affective Disorders and Miscellaneous Psychotic Reactions. 16. Organic Disorders and Toxic Reactions. 17. Psychoneuroses and Psychosomatic Disorders. 18. Therapy.

Part III. Neurosurgery. 19. Introduction. 20. Tumors. 21. Infections. 22. Malformations. 23. Vascular Lesions. 24. Trauma. 25. Pain 26. Psychosurgery. 27. Epilepsy. 28. Dyskinesias. 29. Herniated Disks. 30. The Sympathetic. 31. The Hypophysis. 32. Roentgenology. 33. Technic. 34. Miscellaneous. Index.

Like its predecessors, this year book is an interesting and invaluable publication. New additions to our knowledge in the fields of Neurology, Psychiatry and Neurosurgery are clearly presented and critically evaluated.

It is impossible to discuss the whole book in the scope of one short review. Special mention should, however, be made of the excellent sections on Infectious diseases of the Nervous System (such as meningitis, encephalomyelitis and poliomyelitis) and on treatment in psychiatry.

This volume should find a place on the shelf of every neurologist and psychiatrist who wishes to keep abreast of times.

A.B.

CORRESPONDENCE : BRIEWERUBRIEK

REACTION FOLLOWING DEXTRAN INFUSION

To the Editor: In view of the apparent rarity of serious reactions to intravenous Dextran, the following case is of interest.

Mrs. C., a European female aged 37 years, was admitted with menorrhagia. On admission, her pulse rate was 80 per minute, blood pressure 95/55 mm. Hg and haemoglobin estimation 50% (Sahli-Adams). Her normal blood pressure is 130/90 mm. Hg. Provisional diagnosis of metropathia haemorrhagica was made. One pint of blood was transfused without any abnormal reaction on 11 February 1955.

On 12 February 1955 Dextran was set up preparatory to a further blood transfusion. After the administration of less than 10 c.c. of the fluid the patient complained of an intense pruritus and a few seconds later a diffuse urticarial eruption appeared. (The patient later stated that she had experienced a 'tingling' sensation in the small of the back immediately before the pruritus.) Adrenaline was injected intramuscularly and intravenously and the drip changed to dextrose in water at a very slow rate.

The patient became very restless and moaned fears of impending death. This was rapidly followed by a brief period of unconsciousness, during which she was pulseless and the blood pressure could not be recorded on a baumonometer; extreme facial pallor without sweating was noted, respirations were not perceptible and the praecordium was silent. The patient then with returning consciousness became for several minutes very restless, vomited and again voiced fears of impending death.

Thereafter she was completely confused for nearly an hour; for instance, she attempted to catch a non-existent mosquito with her hand and did not apparently recognize her surroundings or her husband; during this time she expressed an urgent desire to defaecate and had a bowel action in bed. With the return of consciousness, the pulse became perceptible at first at about 130 per min. and the blood pressure was recorded at 20/0 mm. Hg. Over a period of 3 hours adrenaline was administered at intervals until the blood pressure appeared to be maintained at 60/40 mm. Hg and the pulse rate was 80-90 per min. The patient was transferred to Cape Town, where packed-cell transfusions were administered at intervals.

The following drugs had been given without any untoward symptoms: 20 mg. of progesterone intramuscularly b.d., a total daily dose of 30 mg. of stilboestrol by mouth for 3 days before the reaction, and 1 c.c. of hepastab forte intramuscularly 40 hours, and 2 c.c. 15 hours, before the reaction occurred. In both transfusions cut-downs were done under local procaine anaesthesia. A mild local reaction at the site of the injection of a long-acting penicillin preparation several months earlier is the only relevant detail in the past history. She had also received several injections of hepastab forte without any abnormal reaction.

It is also of interest to note the relatively slow pulse in association with the lowered blood-pressure readings. In fact even with a fall in the blood pressure before the 2nd transfusion (80/45 mm. Hg) the pulse rate had remained at 80-90 per min. There was in this case a history of excessive menstrual loss over a period of several years and an associated chronic anaemia.

E. W. Albertyn
Resident Medical Officer

Hospital
S.A.D.
Alexander Bay
10 March 1955